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ABSTRACT

A sample of 90 children drawn from kindergarten, second grade, and fourth grade participated in a study of ability to decode ambiguous and unambiguous verbal messages. Subjects were read 12 message stems, each followed by a question pertaining to the contents of the stem. For half of the messages, the meaning of the questions was unambiguous; for the other half, the questions contained pronouns without specified referents. Subjects were asked to judge whether a question was a "good" one, to answer the "good" questions, and to explain what was wrong with the "bad" questions. Results indicated that children's ability to distinguish between adequate and inadequate communication increased with age. Kindergarten children, significantly more than second or fourth graders, constructed meaningful sentences when the meaning was objectively ambiguous. They did this by selecting referents for pronouns in conditions in which no referents were specified. (AA)

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Children's Comprehension of Referential Communication: Decoding Ambiguous Messages

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In order to communicate effectively, the speaker must accommodate his messages to the informational needs of the listener by coordinating his own perspective of the referent with the listener's perspective. According to Piaget (1926), preoperational children are ineffective, or "egocentric" communicators because they are incognizant of perspectives other than their own. Consequently, they communicate to others as if everyone shared their own intuitively derived point of view. That lack of perspective-taking is related to ineffective verbal encoding in communication has been confirmed by Flavell (1968), Krauss and Glucksberg (1969), Krauss and Rotter (1968), Bearison and Cassel (1975), and Rubin (1972).

In addition to studies of the coordination of speaker-listener perspectives in communicative encoding, Piaget studied how children function as listeners, or decoders. Children were told stories and then asked to retell them to other children. Piaget (1926) reported that preoperational children failed to recognize numerous referential ambiguities in their speakers' messages. For example, it was quite

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common for the child speakers to use pronouns without ever indicating their referents, and it was just as common for the child listeners to find idiosyncratic meanings in the messages by supplying their own referents based on their intuitive experience. Piaget concluded that the inability to coordinate speaker-listener perspectives results in egocentric encoding as well as egocentric decoding. In regard to the latter, he noted that, "If children fail to understand one another, it is because they think they do understand one another" (p. 116).

The majority of studies of the development of interpersonal communication have focused on children's ability to encode verbal messages (see Glucksberg, Krauss, & Higgins, 1975). There have been comparatively few studies of how children decode messages. In several studies, measures were obtained of how well subjects were able to decode messages, however, these measures were solely to determine the accuracy of other subjects' encodings (Cohen & Klein, 1968; Krauss & Rotter, 1968; Baldwin, McFarlane & Garvey, 1971; and Pozner & Saltz, 1974). Among the few studies that have focused specifically on children's decoding ability, messages that were used as stimuli for decoding were not standardized across subjects. Consequently, subjects' ability to decode messages was confounded in one way or another with other subjects' ability to encode messages. For example, Heider (1971) studied children's ability to decode referential messages. Ten year old children were asked to describe a target stimulus from an array of five related stimuli (Frois-Wittman faces or abstract forms of low

codability) so that another child of the same age could identify the target stimulus from the array. Two weeks later, the same children were asked to decode other children's messages. According to Heider, "Each decoder received a different set of actual encodings..." (p. 40).

The present study assessed children's ability to decode ambiguous and unambiguous verbal messages using standardized procedures. In ambiguous messages, pronouns were used without indicating their referents. It was predicted that children's ability to recognize the inappropriateness of ambiguous messages, compared to unambiguous messages, would increase with age.

Subjects were 90 middle-class children from the following grades of a suburban elementary school: kindergarten, second and fourth. There were approximately equal numbers of males and females at each grade level. Lorge-Thorndike IQ scores were available for the fourth graders and ranged from 95 to 139 with a mean of 115.

The subjects were read 12 message stems, each followed by a question pertaining to the contents of the stem. For half of the messages, the meaning of the questions were unambiguous, while for the other half, the questions contained pronouns without specified referents. An example of an adequate message was "Jane got a bicycle for Christmas and Mary got a new coat. What did Jane get for Christmas, a bicycle or a new coat?" In the ambiguous condition, the question was, "What did she get for Christmas, a bicycle or a new coat?" Each stem was matched to an adequate or inadequate question on alternate administrations.

The subjects were told that the experimenter was trying out some questions that would be asked to other children and that they could help the experimenter by listening to the questions and judging whether they were "good" or "bad" questions. If a subject thought that a question was a good one, he was to answer it; if it was not a good one, he was to say so and, if possible, explain what was wrong with it. Subjects were given a sample of a good and bad question. On the sample items, subjects were told if their responses were correct and were given the correct response, if incorrect. For the remainder of the questions, no feedback was given.

Measures of the subjects' ability to distinguish adequate and inadequate messages were based on their judgments of the quality of the questions and their response latencies. Subjects were given a score of one for each correct judgment and a score of zero for incorrect judgments. A correct judgment in the unambiguous condition consisted of giving the correct answer to the question and, in the ambiguous condition, of not answering the question and offering some recognition, in the form of an explanation, of its ambiguity. Judgment scores were summed within communicative conditions, yielding a range of zero to six for each condition. A judgment score of six in the unambiguous condition indicated that a subject answered each question correctly, while a score of zero in the ambiguous condition indicated that the subject answered each question by selecting his own referent for the pronoun when, in fact, no referent had been specified. Response latencies were based on the amount of time that elapsed from hearing

the questions to either answering them or saying that they were not good questions. If no response was made within 15 seconds, a latency score of 15 was recorded. Within communicative conditions, latency scores ranged from 6 to 90 for each subject. A score of 90 indicated that a subject did not offer any responses to any of the questions.

Results and discussion. Judgment and latency scores were initially analyzed by three-way analyses of variance for the following factors: grade, sex, and communicative condition (repeated condition). As there were no main effects or interactions involving sex as a factor, further analyses were limited to grade (3 levels) and communicative condition (2 levels).

On the analysis of judgment scores, grade and communciative condition were significant main effects, F (2, 84) = 22.3, $p < .001$, and F (1, 84) = 82.8, $p < .001$, respectively. A positive relationship was hypothesized between grade and ability to recognize ambiguous referents in comparison to unambiguous referents. This hypothesis was supported by a significant disordinal interaction between grade and communicative conditon, F (2, 84) = 11.6, $p < .001$. There was a significant difference in judgment scores across communicative conditions at each grade level with lower scores in the ambiguous compared to the unambiguous condition, F's (2, 84)= 8.3, 10.1, and 14.6 respectively for the kindergarten, second and fourth grades. There was also a significant difference across grade levels for each communicative condition. This effect was most dramatic in the ambiguous condition where the mean judgment scores were 1.70, 3.51, and 5.12 for the kindergarten, second and fourth grades. All pair-wise comparisons

of means were significant ($p < .01$, Tukey tests). In the unambiguous condition, judgment scores ranged from 5.13 to 5.93 indicating that subjects at all grade levels had little difficulty in responding to unambiguous questions.

The analysis of latency scores was expected to provide a more sensitive index of children's recognition of ambiguous referents than judgment scores alone. It was expected that long latencies would be a sign of subjects' recognition of the ambiguity of messages. Therefore, longer latencies would occur in the ambiguous compared to the unambiguous communicative condition. This hypothesis was supported by a main effect for communicative condition, F (1 , 84) = 25.3, $p < .001$. Grade was also a significant main effect, F (2, 84) = 5.3, $p < .01$. Latency scores for kindergarten subjects were significantly greater than for second graders, and second grader's latencies were significantly greater than fourth graders' ($p < .01$, Tukey tests). It was also expected that there would be a significant grade by condition interaction as a function of longer latencies for second graders in the ambiguous condition compared to kindergarten and fourth graders. This interaction would have reflected a developmental transition among second graders from failing to distinguish between ambiguous and unambiguous referents and therefore answering both types of questions without hesitation to relative ease in making the distinction which would also lead to short response latencies. However, contrary to expectation, there was not a significant grade by communicative condition interaction. This was probably due to long latencies by kindergarten subjects in both

communicative conditions.

A further test of the relationship between the ability to comprehend referent messages and response latencies was obtained by assigning subjects, on the basis of their judgment scores in the ambiguous condition, to one of three categories. Subjects with judgment scores between zero and one were classified as noncomprehenders; subjects with judgment scores between two and four as transitional; and those with scores of five and six as comprehenders. There was a significant main effect for levels of comprehension on an analysis of variance of the latency scores, F (2, 81) = 7.0, $p < .01$. Subjects at the transitional level had significantly longer latencies (mean = 14.13) than subjects at either the level of noncomprehension or full comprehension (means = 9.92 and 8.54, respectively; $p < .01$, Tukey tests).

The present findings indicate the course of development of children's ability to decode verbal messages. Children's ability to distinguish between adequate and inadequate communication increased with age. Kindergarten children, significantly more than second or fourth graders, constructed meaningful sentences when the meaning was objectively ambiguous. They did this by selecting referents for pronouns in conditions in which no referents were specified. Older children, on the other hand, had little difficulty in distinguishing between ambiguous and unambiguous messages. This finding parallels those concerning the development of children's ability to encode messages (see Glucksberg, Krauss & Higgins, 1975). It thus appears that young children are not only poor message encoders, they are poor decoders as well.

The present findings regarding children's ability to decode messages are in accord with those reported by Dittman (1972) who studied the frequency of listener responses, such as head nods and vocalizations including "uh-huh," "yea," and "I see." The development of this type of communicative skill showed an orderly progression among children in the first, third, and fifth grades.

In general, evidence of parallel age development in encoding and decoding abilities is consistent with Piaget's position that egocentric encoding is subsumed by similar cognitive structures as is egocentric decoding. However, the presence of age parallelism, by itself, does not necessarily imply common underlying structures. For example, Asher and Oden (1976) reasoned that if chidren were decoding in an egocentric manner, then their messages while lacking objective meaning for another (public meaning), would have meaning for the self (private meaning). However, they found that children who encoded poorly were also less effective than good encoders in decoding thier own messages.

In the present study, the chice of referents on two of the twelve items of the decoding task permitted further inquiry regarding the question of egocentrism in children's decoding. In two of the message stems, first-person referents were paired with second-person referents. For example, one of the sentences was, "My birthday is in March and you're birthday is in ..... When is the birthday, in March or .....?" When children made errors on these types of questions in the ambiguous condition, it was expected that they would err in the direction of interpreting the meaning of the questions by choosing the second-person referent as that was the one that specifically referred to themselves.

However, among 34 subjects who made errors on these items, the errors were not significantly more often in the predicted direction. Instead, subjects tended to choose the last referent mentioned as the appropriate one. Thus, while further research is needed in order to understand the development of communicative encoding and decoding, such research should also test the question of egocentricity in developmentally early forms of communication.

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Footnote

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